

IN THE CLAIMS

What is claimed is:

1-7. (Canceled)

8. (Currently Amended) A system comprising:

a hardware platform including a residual fixed function hardware device represented by a hardware component of a soft device;

a first virtual machine ~~monitor~~, coupled to the hardware platform, the first virtual machine ~~monitor~~ including a driver of the soft device, the soft device driver controlling the residual fixed function hardware device; ~~and~~

~~one or more~~ a second virtual machines, coupled to the hardware platform ~~virtual machine monitor~~, the ~~one or more~~ second virtual machines utilizing the soft device when needed, the soft device being independent of any operating system run by the second virtual machines; and

a virtual machine monitor (VMM), coupled to the hardware platform and the first and second virtual machines, to present the first virtual machine to the second virtual machine as an external or internal device, and to emulate communication between the first and second virtual machines using a virtualized connectivity means linked to the software component of the soft device,

wherein the VMM emulates communication between the first and second virtual machines by trapping accesses of one of the virtual machines to the virtualized connectivity means, and redirecting the accesses to another of the virtual machines via the virtualized connectivity means .

9-10. (Cancelled)

11. (Currently Amended) A method for constructing a soft device, the method comprising:

implementing a software component of the soft device in a first virtual machine, the software component controlling a residual fixed function hardware device represented by a hardware component of the soft device; and

making the soft device available for use by a second virtual machine, the soft device being independent of an operating system run by the second virtual machines;

wherein making the soft device available comprises:
presenting the first virtual machine to the second virtual machine as an external or
internal device; and
emulating communication between the first and second virtual machines using a
virtualized connectivity means linked to the software component of the soft device, wherein
accesses to the virtualized connectivity means by one of the virtual machines are trapped and
redirected to another of the virtual machines via the virtualized connectivity means.

12. (Cancelled)

13. (Cancelled)

14. (Currently Amended) The method of claim 13 wherein emulating communication ~~further~~ comprises:

providing a virtualized serial communications link;

providing a virtualized serial communications port to each of the first virtual machine and the second virtual machine;

linking the virtualized serial communications port provided to the first virtual machine to the software component of the soft device using reflection software;

trapping each access by one of the first virtual machine and the second virtual machine to the virtualized serial communication port; and

reflecting said each access to the other of the first virtual machine and the second virtual machine via the virtualized serial communications link.

15. (Currently Amended) The method of claim 13 wherein emulating communication ~~further~~ comprises:

providing a virtualized universal serial bus (USB) to USB bridge device;

providing a virtualized USB host controller to each of the first virtual machine and the second virtual machine;

linking the virtualized USB host controller provided to the first virtual machine to the software component of the soft device using reflection software;

trapping each access by one of the first virtual machine and the second virtual machine to

the virtualized USB host controller; and

reflecting said each access to the other of the first virtual machine and the second virtual machine via the virtualized USB to USB bridge device.

16. (Cancelled)

17. (Currently Amended) The method of claim ~~16~~ 11 wherein emulating communication further comprises:

providing a virtualized peripheral component interconnect (PCI) bus;
linking the virtualized PCI bus to the software component of the soft device using reflection software;
trapping each access by one of the first virtual machine and the second virtual machine to the virtualized PCI bus; and
reflecting said each access to the other of the first virtual machine and the second virtual machine.

18. (Currently Amended) The method of claim ~~11~~ wherein ~~making the soft device available for use by the second virtual machine~~ further comprising comprises:

~~emulating a network communication between the first virtual machine and the second virtual machine by~~ providing a virtual network interface card (NIC) to each of the first virtual machine and the second virtual machine.

19. (Currently Amended) The method of claim ~~11~~ wherein ~~making the soft~~ external or internal device is ~~available for use by the second virtual machine~~ further comprises:—

~~presenting the first virtual machine to the second virtual machine as a hardware device;~~
and
~~emulating communication between the first virtual machine and the second virtual machine.~~

20. (Currently Amended) The method of claim 19 wherein emulating communication ~~further~~ comprises:

providing a virtualized peripheral component interconnect (PCI) bus;

trapping each access by one of the first virtual machine and the second virtual machine to the virtualized PCI bus; and

reflecting said each access to the other of the first virtual machine and the second virtual machine via the virtualized PCI bus.

21. (Currently Amended) The method of claim 19 wherein emulating communication further comprises:

providing a virtualized universal serial bus (USB) connection;

providing a virtualized USB bus interface to the first virtual machine;

providing a virtualized USB host controller to the second virtual machine;

trapping each access by one of the first virtual machine and the second virtual machine to the virtualized USB bus; and

reflecting said each access to the other of the first virtual machine and the second virtual machine via the virtualized USB connection.

22. (Original) The method of claim 19 wherein the hardware device is any one of a PCI card, an external USB device, an internal USB device, and any other standard personal computer peripheral device.

23. (Original) The method of claim 19 wherein presenting the first virtual machine to the second virtual machine as a hardware device further comprises:

configuring the first virtual machine to match the hardware device.

24. (Original) The method of claim 23 wherein the software component of the soft device comprises at least a portion of software of a fixed function device.

25. (Original) The method of claim 24 further comprising:

varying the portion of software that is used as the software component depending on how closely the first virtual machine matches the hardware device.

26. (Currently Amended) A method for constructing a soft device, the method comprising: implementing software components of the soft device in a plurality of dedicated virtual

machines, each of the software components controlling a residual fixed function hardware device represented by a hardware component of the soft device; and

making the soft device available for use by a main virtual machine, the soft device independent of an operating system run by the main virtual machine;

wherein making the soft device available comprises:

presenting the plurality of dedicated virtual machines to the main virtual machine as a hardware device; and

emulating communication between the plurality of dedicated virtual machines and the main virtual machine using a virtualized communication means linked to the software components of the soft device, wherein accesses to the virtualized communication means by one virtual machine are trapped and redirected to another virtual machine via the virtualized communication means.

27-29. (Cancelled)

30. (Currently Amended) The method of claim 29 ~~26~~ wherein the virtualized communication means is any one of a virtualized serial communications link, a virtualized universal serial bus (USB) to USB bridge device, a virtualized peripheral component interconnect (PCI) bus, a virtual network interface card, and a virtualized USB connection.

31. (Currently Amended) A system comprising:

a hardware platform including a residual fixed function hardware device represented by a hardware component of a soft device;

a virtual machine monitor (VMM), coupled to the hardware platform; and

a plurality of virtual machines, coupled to the virtual machine monitor, the plurality of virtual machines including one or more dedicated virtual machines with one or more software components of the soft device implemented therein, and remaining one or more virtual machines utilizing the soft device when needed, the soft device being independent of any operating system run by the virtual machines;

wherein the VMM is to present the plurality of virtual machines to the main virtual machine as a hardware device, and to emulate communication between the plurality of virtual machines and the main virtual machine using a virtualized communication means linked to the

software component of the soft device, the VMM emulating the communication by trapping accesses of one virtual machine to the virtualized communication means and redirecting the accesses to another virtual machine via the virtualized communication means.

32-34. (Cancelled)

35. (Currently Amended) The system of claim 31 wherein the VMM is ~~to make the soft device available by~~ emulating a network communication between the plurality of virtual machines by providing a virtual network interface card (NIC) to each of the plurality of virtual machines.

36. (Cancelled)

37. (Currently Amended) The system of claim ~~36~~ 31 wherein the hardware device is any one of a PCI card, an external USB device, an internal USB device, and any other standard personal computer peripheral device.

38. (Cancelled)

39. (Currently Amended) The system of claim ~~38~~ 31 wherein the virtualized communication means is any one of a virtualized serial communications link, a virtualized universal serial bus (USB) to USB bridge device, a virtualized peripheral component interconnect (PCI) bus, a virtual network interface card, and a virtualized USB connection.

40-41. (Cancelled)

42. (Currently Amended) A computer readable storage medium that provides comprising instructions, which when executed on a processor, cause said processor to perform operations comprising:

implementing a software component of the soft device in a first virtual machine, the software component controlling a residual fixed function hardware device represented by a hardware component of the soft device; and

making the soft device available for use by a second virtual machine, the soft device being independent of an operating system run by the second virtual machine;

wherein making the soft device available comprises:

presenting the first virtual machine to the second virtual machine as an external or internal device; and

emulating communication between the first and second virtual machines using a virtualized connectivity means linked to the software component of the soft device, wherein accesses to the virtualized connectivity means by one of the virtual machines are trapped and redirected to another of the virtual machines via the virtualized connectivity means.

43. (Cancelled)

44. (Currently Amended) A computer readable storage medium that provides comprising instructions, which when executed on a processor, cause said processor to perform operations comprising:

implementing software components of the soft device in a plurality of dedicated virtual machines, each of the software components controlling a residual fixed function hardware device represented by a hardware component of the soft device; and

making the soft device available for use by a main virtual machine, the soft device being independent of an operating system run by the main virtual machine;

wherein making the soft device available comprises:

presenting the plurality of dedicated virtual machines to the main virtual machine as a hardware device; and

emulating communication between the plurality of dedicated virtual machines and the main virtual machine using a virtualized communication means linked to the software components of the soft device, wherein accesses to the virtualized communication means by one virtual machine are trapped and redirected to another virtual machine via the virtualized communication means.

45. (Cancelled)